## BASIS FOR PRELIMINARY COST ESTIMATES SEDIMENT REMEDIATION FOX RIVER, WISCONSIN LITTLE LAKE BUTTE DES MORTS

Material Handling Assumptions:			
Volume > 250 ppb	1,626,352	cv	1,241,490 m3
Volume > SWAC	1,128,565	•	861,500 m3
Volume > 50 ppm	62,742		47,895 m3
Volume > SWAC and < 50 ppm	804,852	cy	614,391 m3
Volume > SWAC Not Capped	734,256		560,501 m3
Volume > 50 ppm - Cap Area	8,070	cy	6,160 m3
Solids Specific Gravity	2.5		
Fresh Water Density		lb/ft3	4.04
In Situ Density Horizontal Auger Slurry Density (30% in situ)	24.2% 9.4%		1.01 tons per cy
Dewatered Density  Dewatered Density		w/w 3.9% v/v w/w 28.5% v/v	0.89 tons per cy 1.20 tons per cy
Treated Density		w/w 84.6% v/v	1.92 tons per cy
Cost Estimating Parameters & Methodology:	0.00/		
Interest Rate Sales Tax	8.0% 5.5%		
Engineering, Procurement and Construction Mgmt	12.0%		
Contractor Overhead and Profit - Dredging Only	15.0%		
Dredging Oremeda and From Bredging Omy	15.070		
Dredge Monitoring (Water Quality)	\$800	per day	
Sediment Removal QA		per day	
Hydraulic Low Solids - 10-inch Horizontal Auger (2917 gpm)			
Site Preparation		per dredge launch site	
Mobilization - Equipment		per dredge	
Mobilization - Silt Curtain	\$35,000		
Shift Rate (12 hours)		per shift	
Dredge Rate		cy in situ per 12 hour shift	
Site Restoration	\$25,000	per dredge launch site	
Hydraulic Low Solids - 6-inch Horizontal Auger (673 gpm) Site Preparation	\$100,000	1.5	
Mobilization - Equipment		per dredge	
Mobilization - Silt Curtain	\$35,000	per diedge	
Shift Rate (12 hours)		per shift	
Dredge Rate		cy in situ per 12 hour shift	
Site Restoration	\$25,000		
Mechanical			
Dock Construction	\$400,000		
Mobilization - Equipment		per dredge	
Mobilization - Silt Curtain	\$35,000		
Mobilization - Watertight Barge	\$100,000		
Shift Rate (10 hours) Dredge Rate		per shift cy in situ per 10 hour shift	
Offload Stockpile Area Prep.	\$75,000		
Barge Capacity	500		
Free Water per cy Dredged (10%)		gal	
Offload Shift Rate (8 hours)		per shift	
Upland Offloading Rate	500	cy per shift	
Barge Movement Time	4	hours	
Offload Crane Mobilization	\$50,000		
Site Restoration	\$25,000	LS	
Sediment Treatment			
High Temperature Thermal Desorption	\$50,000		
Setup Staging Area Mobilization/Site Prep	\$150,000		
Sediment Treatment QA		per ton	
Ratio of Amending Sand Volume to Dredge Vol.	0.25		
Sand Purchase and Deliver		per ton	
Blending		per ton	
HTTD (includes off-gas treatment)		per ton	
Stack Testing	\$50,000	LS	
Placement in CDF	\$2	per ton	
Capping	<b>#106.000</b>		
Mobilization/Site Prep Area	\$100,000 6,479,673	sf 601,996	m2
Depth	0,479,673		1112
Geomembrane (80 mil)		per sy	
Cobbles	\$25	per cy	
Cap Riggement QA	\$100,000	LS	

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\$65,000 per year \$30,000 per year

Nearshore CDF	Arrowhead		Menasha	
Land Lease or Purchase		per sf	\$1.8	
Length	8,000		9,200	
Capping Volume	190,000		170,000	
Seeding Area	280,000		250,000	
Sheetpile Wall Length	8,000		9,200	
Sheetpile Depth	30		30	
Sheetpile Cost		per sf	\$19	
Shot Rock Berm Rip Rap		per lf per lf	\$550 \$250	
Place Treated Material		per ii per cy	\$230 \$2	
Clean Soil Cap		per cy	\$10	
Seeding		per sy	\$1	
Mitigation	\$10,000		Ψ.	
	\$10,000			
Long-term Monitoring	\$20,000			
Long-term O&M	\$25,000			
Solidification				
Percent Cement	5.0%	(w/w)		
Cement	\$80	per ton	Mixing	\$25 per ton
Dewatering - Upland Pond (2 cells)	Gravity >250			Gravity >SWAC
Land Lease or Purchase	\$1.80			240.204
Area	360,284			360,284
Perimeter	2,401	feet		2,401
Depth of Material in Dewatering Cell		hours		
Cell Retention Time Cell Depth		nours feet		
Mobilization	\$20,000			
Clear and Grub	,	per acre		
Berm Volume		cy per lf		
Berm Construction		per cy		
Rough Grading	\$0.25			
Liner Purchase/Placement	\$0.50			
Demob/Disposal	\$10,000			
Regrade Berm Soils	\$6	per cy		
Seed/Sod	\$1	per sy		
Dewatering - Mechanical				
Mobilization	\$100,000			
Holding Pond-Centrifuge	\$80	per bone dry ton		
Water Transferrent				
Water Treatment Flow Rate	749	gpm		
Unit, Purchase	\$1,013,771			
Water Treatment (Including Operator)		per 1,000 gallons		
Water Treatment QA		per day		
	4=00	F7		
Disposal				
Off-Site Disposal				
Load Soil for Hauling		per ton		
Round-trip Hauling		hours		
Tipping Fee (non-TSCA)		per ton		
Tipping Fee (TSCA)		per ton		
Truck Rate		per hour		
Truck Load	32	tons		
Institutional Controls Public Education Program	\$100,000			
O&M Plans	\$100,000			
Deed Restrictions	\$20,000 \$5,000			
Annual Costs	\$5,000			
Public Education Program	\$30,000			
Maintaining O&M Plans	\$800			
Reporting	\$20,000			
Long-term Monitoring	\$20,000			
- "				

#### ALTERNATIVE A: Dredge Sediment >250 ppb with Off-site Disposal

Capital Items		Quantity	Units	Cost
Site Preparation		2	Each	\$200,000
Mobilization - Equipmen		1	LS	\$285,000
Dredging - 12 hour shift Dredge Monitoring (Wa		626 626	Day Day	\$2,629,200 \$500,800
Sediment Removal QA	uci Quanty)	626	Day	\$751,200
Site Restoration		2	Each	\$50,000
	Direct Capital:			\$4,416,200
	Engineering, Procurement &	c Construction Manageme	nt:	529,944
	Contractor Overhead/Profit:	:		662,430
	Total Capital:			\$5,600,000
	SED	DIMENT DEWATE	RING (GRAVITY)	
Land Lease or Purchase		360,284	sf	\$648,511
Mobilization		1	LS	\$20,000
Clear and Grub		360,284	sf	\$16,542
Berm Construction		5,762	cy	\$34,574
Rough Grading		360,284	sf	\$90,071
Liner Placement Demob/Disposal		360,284 1	sf LS	\$180,142 \$10,000
Regrade		5,762	cy	\$34,574
Seed/Sod		40,032	sy	\$40,032
	Direct Conitals			\$1,074,445
	Direct Capital:			
	Engineering, Procurement &	Construction Manageme	nt:	128,933
	Total Capital:			\$1,200,000
		WATER TREA	ATMENT	
748 gpm unit, Purchase		1	LS	\$1,013,771
Water Treatment (Include	des Operator)	943,086,964	gal	\$377,235
Water Treatment QA		876	day	\$175,200
	Direct Capital:			\$1,566,206
	Engineering, Procurement &	Construction Manageme	nt:	187,945
	Total Capital:			\$1,800,000
	SI	EDIMENT DISPOS	AL (OFF-SITE)	
Capital Items		Quantity	Units	Cost
Solidification		950,680	ton	\$23,767,000
Cement Purchase		45,271	ton	\$3,621,680
Soil Loading		950,680	ton	\$2,661,904
-				
Soil Hauling		950,680	ton	\$4,456,313
Tipping Fees (non-TSC	A)	914,004	ton	\$39,302,174
Tipping Fees (TSCA)		36,676	ton	\$2,017,177
	Direct Capital:			\$75,826,248
	Engineering, Procurement &	Construction Manageme	nt:	9,099,150
	Total Capital:			\$84,900,000
	TOTAL COST			\$93,500,000

## ALTERNATIVE B: Dredge Sediment to SWAC with Off-site Disposal

Capital Items		Quantity	Units	Cost
Site Preparation		2	Each	\$200,000
Mobilization - Equipme		1	LS	\$285,000
Dredging - 12 hour shift		435	Day	\$1,827,000
Dredge Monitoring (Wa	iter Quality)	435	Day	\$348,000
Sediment Removal QA		435	Day	\$522,000
Site Restoration		2	Each	\$50,000
	Direct Capital:	G W		\$3,232,000
	Engineering, Procurement & Contractor Overhead/Profit:		nt:	387,840 484,800
	Total Capital:			\$4,100,000
	CED	IMENT DEWATE	DING (CDAVITY)	
Land Lease or Purchase		IMENT DEWATE 360,284	sf	\$648,511
Mobilization	,	1	LS	\$20,000
Clear and Grub		360,284	sf	\$16,542
Berm Construction		5,762	cy	\$34,574
Rough Grading		360,284	sf	\$90,071
Liner Placement		360,284	sf	\$180,142
Demob/Disposal		1	LS	\$10,000
Regrade		5,762	cy	\$34,574
Seed/Sod		40,032	sy	\$40,032
	Direct Capital:			\$1,074,445
	Engineering, Procurement &	Construction Manageme	nt:	128,933
	Total Capital:			\$1,200,000
		WATER TREA	ATMENT	
748 gpm unit, Purchase		1	LS	\$1,013,771
Water Treatment (Inclu		654,430,901	gal	\$261,772
Water Treatment QA	,	608	Day	\$121,600
	Direct Capital:			\$1,397,144
	Engineering, Procurement &	Construction Manageme	nt:	167,657
	Total Capital:			\$1,600,000
	SI	EDIMENT DISPOS	AL (OFF-SITE)	
Capital Items		Quantity	Units	Cost
Solidification		659,700	ton	\$16,492,500
Cement Purchase		31,415	ton	\$2,513,200
Soil Loading		659,700	ton	\$1,847,160
Soil Hauling		659,700	ton	\$3,092,344
Tipping Fees (non-TSC	A)	623,024	ton	\$26,790,034
	n)			
		36,676	ton	\$2,017,177
Tipping Fees (TSCA)				
Tipping Fees (TSCA)	Direct Capital:			\$52,752,415
Tipping Fees (TSCA)	Direct Capital: Engineering, Procurement &	: Construction Manageme	nt:	\$52,752,415 6,330,290

#### INSTITUTIONAL CONTROLS

Capital Items		Quantity	Units		Cost
Public Education Progra	am	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Constru	ction Manageme	nt:		15,000
	Total Capital:				\$140,000
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	\$20,000	\$238,492
Public Education Progra	am		40	\$30,000	\$357,738
Maintaining O&M Plan	1S		40	\$800	\$9,540
Reporting			40	\$20,000	\$238,492
	Total Present Worth, Longer Term C	0&M Costs			\$844,263
	Total Project Capital and O&M C	ost			\$1,000,000
	TOTAL COST				\$67,000,000

#### ALTERNATIVE C: Dredge Sediment to SWAC with on-site HTTD, Dispose in On-site CDF

#### SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items	Quantity	Units
Dock Construction	1	LS
Mobilization - Equipment and Silt Curtain	1	LS
Watertight Barges	4	ea
Offload Stockpile Area Prep.	1	LS
Dredging - 10 hour shifts	126	Day
Dredge Monitoring (Air and Water Quality)	126	Day
Sediment Removal QA	126	Day
Offload Crane Mobilization	1	LS
Crane Offloading - 8 hour shifts	126	Day
Direct Capital:		
Engineering, Procurement & Con	struction Manageme	nt:
Contractor Overhead/Profit:		
Total Capital:		

#### SEDIMENT TREATMENT (HIGH TEMPERATURE THERMAL DESORPTION)

Capital Items		Quantity	Units	Cost
Setup Staging Area		2	LS	\$100,000
Mobilization/Site Prep		2	LS	\$300,000
Sand Purchase		21,960	ton	\$131,759
Blending		85,321	ton	\$2,133,019
Sediment Treatment		85,321	ton	\$6,399,057
Sediment Treatment QA		85,321	ton	\$170,642
Stack Testing		1	LS	\$50,000
Placement in CDF		47,400	ton	\$94,801
	Direct Capital:			\$9,284,476
	Engineering, Procurement & Cons	truction Manageme	nt:	1,114,137
	Total Capital:			\$10,400,000

#### SEDIMENT REMOVAL (HORIZONTAL AUGER)

Capital Items	Quantity	Units	Cost
Site Preparation	2	each	\$200,000
Mobilization - Equipment and Silt Curtain	1	LS	\$285,000
Dredging - 12 hour shifts	310	Day	\$1,302,000
Dredge Monitoring (Water Quality)	310	Day	\$248,000
Sediment Removal QA	310	Day	\$372,000
Site Restoration	1	LS	\$25,000
Direct Capital:			\$2,432,000
Engineering, Procurement & C	Construction Manageme	nt:	291,840
Contractor Overhead/Profit:			364,800
Total Capital:			\$3,100,000

#### CDF CONSTRUCTION - ARROWHEAD

Capital Items		Quantity	Units	Cost
Land Lease or Purchase		2,520,000	sf	\$4,536,000
Shot Rock/Rip Rap		8,000	lf	\$6,920,000
Sheetpile Placement		240,000	sf	\$4,560,000
Clean Soil Cap		190,000	cy	\$1,900,000
Seeding		280,000	sy	\$280,000
Mitigation		58	acre	\$578,512
	Direct Capital:			\$18,774,512
	Engineering, Procurement & Construction	on Manageme	nt:	2,252,941
	Total Capital:			\$21,027,454

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Present Worth of Longer Term Operating Costs	Years	Annual Cost	
Mitigation	40	10,000	\$119,246
Long-term Monitoring	40	20,000	\$238,492
Long-term O&M	40	25,000	\$298,115
Total Present Worth, Longer Term O&M Costs			\$655,854
Total Project Capital and O&M Cost			\$21,700,000

#### CDF CONSTRUCTION - MENASHA

Capital Items		Quantity	Units		Cost
Mobilization/Site Prep		27,778	sf		\$50,000
Shot Rock/Rip Rap		9,200	lf		\$7,360,000
Sheetpile Placement		276,000	sf		\$5,244,000
Clean Soil Cap		170,000	cy		\$1,700,000
Seeding		250,000	sy		\$250,000
Mitigation		52	acre		\$516,529
	Direct Capital:				\$15,120,529
	Engineering, Procurement & Constru	action Manageme	nt:		1,814,463
	Total Capital:				\$16,934,992
	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term 0	O&M Costs			\$655,854
	Total Project Capital and O&M C	Cost			\$17,600,000
		WATER TR	EATMENT		
Capital Items		Quantity	Units		Cost
748 gpm unit, Purchase		1	LS		\$1,013,771
Water Treatment (Inclu	des Operator)	467,983,868	gal		\$187,194
Water Treatment QA		434	day		\$86,800
	Direct Capital:				\$1,287,765
	Engineering, Procurement & Constru	action Manageme	nt:		154,532
	Total Capital:				\$1,400,000
	INS	STITUTIONA	L CONTRO	OLS	
G 2 11		0 "	T7 14		G 4
Capital Items		Quantity 1	Units LS		Cost \$100,000
Public Education Progra O&M Plans	am	1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
Deed Restrictions			Lo		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Constru	action Manageme	nt:		15,000
	Total Capital:				\$140,000
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	\$20,000	\$238,492
Public Education Progra	am		40	\$30,000	\$357,738
Maintaining O&M Plan			40	\$800	\$9,540
Reporting			40	\$20,000	\$238,492
	Total Present Worth, Longer Term 0	D&M Costs			\$844,263
	Total Project Capital and O&M C	Cost			\$1,000,000
	TOTAL COST				\$58,200,000

#### ALTERNATIVE D: Dredge Sediment to SWAC with Off-site Disposal of TSCA materials and On-site CDF

#### SEDIMENT REMOVAL (6-INCH HORIZONTAL AUGER)

	Quantity	Units	Cost
	1	Each	\$100,000
ent and Silt Curtain	1	LS	\$285,000
fts	105	Day	\$315,000
ater Quality)	105	Day	\$84,000
	105	Day	\$126,000
	1	Each	\$25,000
Direct Capital:			\$935,000
Engineering, Procurement &	Construction Manageme	nt:	112,200
Contractor Overhead/Profit:			140,250
Total Capital:			\$1,200,000
SEDIM	ENT DEWATERI	NG (MECHANICAL)	
		7.0	
	1	LS	\$100,000
	1 17,465	LS bdt	\$100,000 \$1,397,177
Direct Capital:	1 17,465		
		bdt	\$1,397,177
	Engineering, Procurement & Contractor Overhead/Profit:  Total Capital:	ent and Silt Curtain 1 fits 105 atter Quality) 105 105 105 1 Direct Capital: Engineering, Procurement & Construction Manageme Contractor Overhead/Profit:  Total Capital:	ent and Silt Curtain 1 LS fits 105 Day atter Quality) 105 Day 105 Day 1 Each  Direct Capital: Engineering, Procurement & Construction Management: Contractor Overhead/Profit:

#### SEDIMENT DISPOSAL (OFF-SITE)

	Quantity	Units	Cost
	36,677	ton	\$916,925
	1,747	ton	\$139,760
	36,677	ton	\$102,696
	36,677	ton	\$171,923
	36,677	ton	\$2,017,235
Direct Capital:			\$3,348,539
Engineering, Procurement & Co	nstruction Manageme	nt:	401,825
Total Capital:			\$3,800,000
	Engineering, Procurement & Co	36,677 1,747 36,677 36,677 36,677 36,677 Direct Capital: Engineering, Procurement & Construction Management	36,677 ton 1,747 ton 36,677 ton 36,677 ton 36,677 ton 36,677 ton Direct Capital: Engineering, Procurement & Construction Management:

#### SEDIMENT REMOVAL (10-INCH HORIZONTAL AUGER)

Capital Items	Quantity	Units	Cost
Site Preparation	1	Each	\$100,000
Mobilization - Equipment and Silt Curtain	1	LS	\$285,000
Dredging - 12 hour shifts	310	Day	\$1,302,000
Dredge Monitoring (Water Quality)	310	Day	\$248,000
Sediment Removal QA	310	Day	\$372,000
Site Restoration	1	Each	\$25,000
Direct Capital:			\$2,332,000
Engineering, Procurement & Con	struction Manageme	nt:	279,840
Contractor Overhead/Profit:			349,800
Total Capital:			\$3,000,000

#### CDF CONSTRUCTION - ARROWHEAD

Capital Items		Quantity	Units		Cost
Land Lease or Purchase		2,520,000	sf		\$4,536,000
Shot Rock/Rip Rap		8,000	lf		\$6,920,000
Sheetpile Placement		240,000	sf		\$4,560,000
Clean Soil Cap		190,000	cy		\$1,900,000
Seeding Mitigation		280,000 58	sy		\$280,000
Mitigation		38	acre		\$578,512
	Direct Capital:				\$18,774,512
	Engineering, Procurement & Constru	iction Managemer	nt:		2,252,941
	Total Capital:				\$21,027,454
Present Worth o	Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term C	D&M Costs			\$655,854
	Total Project Capital and O&M C	ost			\$21,700,000
	CDF (	CONSTRUCT	ION - MEN	NASHA	
Capital Items		Quantity	Units		Cost
Mobilization/Site Prep		27,778	sf		\$50,000
Shot Rock/Rip Rap		9,200	lf		\$7,360,000
Sheetpile Placement		276,000	sf		\$5,244,000
Clean Soil Cap		170,000	cy		\$1,700,000
Seeding		250,000	sy		\$250,000
Mitigation		52	acre		\$516,529
	Direct Capital:				\$15,120,529
	Engineering, Procurement & Constru	iction Managemer	nt:		1,814,463
	Total Capital:				\$16,934,992
December 31/2-41	SI T Oti Ct-		Years	Annual Cost	
Mitigation Worth	Longer Term Operating Costs		40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$119,246 \$238,492
Long-term O&M			40	25,000	\$298,115
Long term occur				25,000	
	Total Present Worth, Longer Term (	O&M Costs			\$655,854
	Total Project Capital and O&M C	lost			\$17,600,000
		WATER TR	EATMENT	•	
Capital Items		Quantity	Units		Cost
748 gpm unit, Purchase		Quality 1	LS		\$1,013,771
Water Treatment (Inclu	des Operator)	503,099,738	gal		\$201,240
Water Treatment QA		580	Day		\$116,000
	Direct Conitals				¢1 221 011
	Direct Capital: Engineering, Procurement & Constru	iction Managemer	nt:		\$1,331,011 159,721
		rrumgemer			
	Total Capital:				\$1,500,000

#### INSTITUTIONAL CONTROLS

Capital Items		Quantity	Units		Cost
Public Education Program	m	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Construction	ction Manageme	nt:		15,000
	Total Capital:				\$140,000
Present Worth of	Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	\$20,000	\$238,492
Public Education Program	m		40	\$30,000	\$357,738
Maintaining O&M Plans			40	\$800	\$9,540
Reporting			40	\$20,000	\$238,492
	Total Present Worth, Longer Term O	&M Costs			\$844,263
	Total Project Capital and O&M Co	ost			\$1,000,000
	TOTAL COST				\$51,500,000

#### ALTERNATIVE E: Cap Sediment to Maximum Extent Possible and Dredge to SWAC with Off-site Disposal

#### SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items	Quantity	Units	Cost
Dock Construction	1	LS	\$400,00
Mobilization - Equipment and Silt Curtain	1	LS	\$83,000
Water Tighten Barges	4	ea	\$400,000
Offload Stockpile Area Prep.	1	LS	\$75,000
Dredging - 10 hour shifts	17	Day	\$102,000
Dredge Monitoring (Water Quality)	17	Day	\$13,600
Sediment Removal QA	17	Day	\$20,400
Offload Crane Mobilization	1	LS	\$50,000
Crane Offloading - 8 hour shifts	17	Day	\$49,300
Direct Capital:			\$1,193,30
Engineering, Procurement & Cor	struction Manageme	nt:	143,190
Contractor Overhead/Profit:			178,99
Total Capital:			\$1,500,000
	CAPI	PING	

Capital Items Mobilization/Site Prep Liner Purchase and Place Cobble Purchase and Place		Quantity 1 6,479,673 119,994	Units LS sf cy		Cost \$100,000 \$4,319,782 \$2,999,849
Cap Placement QA		1	LS		\$100,000
	Direct Capital: Engineering, Procurement & Constr	ruction Manageme	nt:		\$7,519,631 902,356
	Total Capital:				\$8,421,987
Present Worth of Monitoring/O&M	Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	\$30,000	\$357,738
Long-term O&M			40	\$65,000	\$775,100
	Total Present Worth, Longer Term	O&M Costs			\$1,132,838
	Total Project Capital and O&M	Cost			\$9,600,000

#### SEDIMENT REMOVAL (HORIZONTAL AUGER)

Capital Items	Quantity	Units	Cost
Site Preparation	2	Each	\$200,000
Mobilization - Equipment and Silt Curtain	1	LS	\$285,000
Dredging - 12 hour shifts	283	Day	\$1,188,600
Dredge Monitoring (Water Quality)	283	Day	\$226,400
Sediment Removal QA	283	Day	\$339,600
Site Restoration	2	Each	\$50,000
Direct Capital:			\$2,289,600
Engineering, Procurement & Con-	struction Manageme	nt:	274,752
Contractor Overhead/Profit:			343,440
Total Canital:			\$2,900,000

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SEDIMENT	DEWA	TEDING	(CDA	VITV

Land Lease or Purchase	360,284	sf	\$648,511
Mobilization	1	LS	\$20,000
Clear and Grub	360,284	sf	\$16,542
Berm Construction	5,762	cy	\$34,574
Rough Grading	360,284	sf	\$90,071
Liner Placement	360,284	sf	\$180,142
Demob/Disposal	1	LS	\$10,000
Regrade	5,762	cy	\$34,574
Seed/Sod	40,032	sy	\$40,032

Direct Capital:

Engineering, Procurement & Construction Management:

Total Capital: \$1,200,000

#### WATER TREATMENT

748 gpm unit, Purchase	1	LS	\$1,013,771
Water Treatment (Includes Operator)	425,942,631	gal	\$170,377
Water Treatment QA	396	Day	\$79,200

Direct Capital:

\$1,263,348 Engineering, Procurement & Construction Management: 151,602

Total Capital: \$1,400,000

#### SEDIMENT DISPOSAL (OFF-SITE)

Capital Items	Quantity	Units	Cost
Solidification	437,764	ton	\$10,944,100
Cement Purchase	20,846	ton	\$1,667,680
Soil Loading	437,764	ton	\$1,225,739
Soil Hauling	437,764	ton	\$2,052,019
Tipping Fees (non-TSCA)	429,208	ton	\$18,455,944
Tipping Fees (TSCA)	8,557	ton	\$470,635

Direct Capital: Engineering, Procurement & Construction Management:

Total Capital: \$39,000,000

#### INSTITUTIONAL CONTROLS

Capital Items	Quantity	Units	Cost
Public Education Program	1	LS	\$100,000
O&M Plans	1	LS	\$20,000
Deed Restrictions	1	LS	\$5,000

Direct Capital: \$125,000 Engineering, Procurement & Construction Management: 15,000

Total Capital: \$140,000

Present Worth of Longer Term Operating Costs Annual Cost Years Long-term Monitoring \$20,000 \$238,492 Public Education Program 40 \$30,000 \$357,738 Maintaining O&M Plans 40 \$800 \$9,540 \$20,000 \$238,492 Reporting

> Total Present Worth, Longer Term O&M Costs \$844,263

> Total Project Capital and O&M Cost \$1,000,000

> TOTAL COST \$56,600,000

\$1,074,445

\$34,816,117 4,177,934

128,933

## BASIS FOR PRELIMINARY COST ESTIMATES SEDIMENT REMEDIATION FOX RIVER, WISCONSIN

## APPLETON TO LITTLE RAPIDS

Material Handling Assumptions:			
Volume > 250 ppb	337,797	су	257,860 m3
Solids Specific Gravity	2.4		
Fresh Water Density		lb/ft3	
In Situ Density	24.2%		1.00 tons per cy
Horizontal Auger Slurry Density (30% in situ)	9.2%		0.89 tons per cy
Dewatered Density	50%	w/w 29.4% v/v	1.19 tons per cy
Cost Estimating Parameters & Methodology:			
Interest Rate	8.0%		
Sales Tax	5.5%		
Engineering, Procurement and Construction Mgmt	12.0%		
Contractor Overhead and Profit - Dredging Only	15.0%		
Dredging  Dredging  Overline (Water Overline)	0000		
Dredge Monitoring (Water Quality) Sediment Removal QA		per day per day	
Hydraulic Low Solids - 6-inch Horizontal Auger (673 gpm)	\$1,200	per day	
Site Preparation	\$100,000	LS	
Mobilization - Equipment		per dredge	
Mobilization - Silt Curtain	\$35,000	F	
Shift Rate (12 hours)	\$3,000	per shift	
Dredge Rate		cy in situ per 12 hour shift	
Site Restoration	\$25,000	LS	
Solidification			
Percent Cement	5%		
Cement	\$80	per ton Mixing	\$25 per ton
Dewatering - Upland Pond			
Land Lease or Purchase	\$1.80	per acre	
Area	82,767	sf	
Perimeter	1,151	lf	
Depth of Material in Dewatering Cell	4	feet	
Cell Retention Time		hours	
Cell Depth		feet	
Mobilization	\$20,000		
Clear and Grub		per acre	
Berm Volume		cy per lf	
Berm Construction Rough Grading		per cy	
Liner Purchase/Placement		per sf per sf	
Demob/Disposal	\$10,000	-	
Regrade Berm Soils		per cy	
Seed/Sod		per sy	
Water Treatment			
Flow Rate	173	gpm	
Unit, Purchase	\$420,850		
Water Treatment (Including Operator)		per 1,000 gallons	
Water Treatment QA		per day	
Dienocal			
<u>Disposal</u> Off-Site Disposal			
Load Soil for Hauling	\$2.80	per ton	
Round-trip Hauling		hours	
Tipping Fee (non-TSCA)		per ton	
Tipping Fee (TSCA)		per ton	
Truck Rate	\$75	per hour	
Truck Load	32	tons	
Institutional Controls			
Public Education Program	\$100,000		
O&M Plans	\$20,000		
Deed Restrictions	\$5,000		
Annual Costs	600.000		
Public Education Program Maintaining O.S.M. Plans	\$30,000		
Maintaining O&M Plans Reporting	\$800 \$20,000		
Reporting  Long-term Monitoring	\$20,000		
Long-term momenting	\$20,000		

## ALTERNATIVE A: Dredge Sediment >250 ppb with Off-site Disposal

Capital Items		Quantity	Units	Cost
Site Preparation		Quantity 5	ea	\$500,000
Mobilization - Equipme	nt and Silt Curtain	5	ea	\$1,425,000
Dredging - 12 hour shift		563	Day	\$1,689,000
Dredge Monitoring (Wa		563	Day	\$450,400
Sediment Removal QA	ior Quarry)	563	Day	\$675,600
Site Restoration		5	ea	\$125,000
	Direct Capital:			\$4,865,000
	Engineering, Procurement &		nt:	583,800
	Contractor Overhead/Profit			729,750
	Total Capital:			\$6,200,000
	SEI	DIMENT DEWATE	RING (GRAVITY)	
Land Lease or Purchase		82,767	sf	\$148,980
Mobilization		1	LS	\$20,000
Clear and Grub		82,767	sf	\$3,800
Berm Construction		2,762	cy	\$16,571
Rough Grading Liner Placement		82,767 82,767	sf sf	\$20,692 \$41,383
Demob/Disposal		1	LS	\$10,000
Regrade		2,762	су	\$16,571
Seed/Sod		9,196	sy	\$9,196
		.,		42,222
	Direct Capital:			\$287,194
	Engineering, Procurement &	& Construction Manageme	nt:	34,463
	Total Canital			\$220,000
	Total Capital:			\$320,000
		WATER TREA	ATMENT	
173 gpm unit, Purchase		1	LS	\$420,850
Water Treatment (Include	ling Operator)	196,092,053	gal	\$78,437
Water Treatment QA	0 1	789	Days	\$157,800
	Direct Capital:			\$657,087
	Engineering, Procurement &	Construction Manageme	nt·	78,850
	8			
	Total Capital:			\$740,000
	s	EDIMENT DISPOS	AL (OFF-SITE)	
Capital Items		Quantity	Units	Cost
Solidification		184,438	ton	\$4,610,950
Cement Purchase		9,220	ton	\$737,600
Soil Loading		184,438	ton	\$516,426
Soil Hauling		184,438	ton	\$864,553
Tipping Fees		184,438	ton	\$7,930,834
apping rees		104,430	ton	φ1,73U,034
	Direct Capital:			\$14,660,364
	Engineering, Procurement &	& Construction Manageme	nt:	1,759,244
		-		<u>-</u>
	Total Capital:			\$16,400,000
	TOTAL COST			\$23,660,000

## **ALTERNATIVE B: Institutional Controls**

## INSTITUTIONAL CONTROLS

Capital Items		Quantity	Units		Cost
Public Education Program		1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
_					
	Direct Capital:				\$125,000
E	Engineering, Procurement & Construc	ction Managemei	nt:		15,000
Т	otal Capital:				\$140,000
Present Worth of L	onger Term Operating Costs		Years	Annual Cost	
Institutional Controls					
Long-term Monitoring			40	\$20,000	\$238,492
Public Education Program			40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting			40	20,000	\$238,492
Т	otal Present Worth, Longer Term O	&M Costs			\$844,263
Т	otal Project Capital and O&M C	Cost			\$1,000,000
Т	COTAL COST				\$1,000,000

# BASIS FOR PRELIMINARY COST ESTIMATES SEDIMENT REMEDIATION FOX RIVER, WISCONSIN LITTLE RAPIDS TO DEPERE DAM

Material Handling Assumptions:					
Volume > 250 ppb	1,187,987	cv		906,860	m3
Volume > SWAC	1,065,014	•		812,988	
Volume > SWAC Not Capped	593,220			452,840	
Solids Specific Gravity	2.47			. ,	
Fresh Water Density		lb/ft3			
In Situ Density	37.1%	w/w 23.2	2% v/v	1.13	tons per cy
Horizontal Auger Slurry Density (30% in situ)	15.6%	w/w 7.0	)% v/v		tons per cy
Dewatered Density	50%	w/w 28.8	8% v/v	1.20	tons per cy
Cost Estimating Parameters & Methodology:	0.00				
Interest Rate	8.0%				
Sales Tax	5.5% 12.0%				
Engineering, Procurement and Construction Mgmt Contractor Overhead and Profit - Dredging Only	15.0%				
Dredging	15.0%				
Dredge Monitoring (Water Quality)	\$800	per day			
Sediment Removal QA		per day			
Hydraulic Low Solids - 10-inch Horizontal Auger (2917 gpm)	7-,	F			
Site Preparation	\$100,000	LS			
Mobilization - Equipment		per dredge			
Mobilization - Silt Curtain	\$35,000				
Shift Rate (12 hours)	\$4,200	per shift			
Dredge Rate		cy in situ per 1	2 hour shift		
Site Restoration	\$25,000	LS			
Length of Piping	7000	ft			
Piping Purchase/Installation	\$15	per ft			
Number of Road Crossings	12	each			
Cost per Road Crossing	\$50,000	per crossing			
Number of Booster Pumps		each			
Booster Pump Cost	\$20,000	each			
Capping					
Mobilization/Site Prep	\$100,000				
Mobilization/Site Prep Full Cap Area	\$100,000 11.814.870	sf	1.097.664	m2	
Full Cap Area	11,814,870		1,097,664 720,297		
	11,814,870 7,753,024		1,097,664 720,297		
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate	11,814,870 7,753,024 1.5 200	sf feet cy per day			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours)	11,814,870 7,753,024 1.5 200 \$2,000	sf feet cy per day per shift			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase	11,814,870 7,753,024 1.5 200 \$2,000 \$6	feet cy per day per shift per ton			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4	sf feet cy per day per shift per ton tons per cy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4	sf feet cy per day per shift per ton tons per cy feet			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25	sf feet cy per day per shift per ton tons per cy feet per cy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4	sf feet cy per day per shift per ton tons per cy feet per cy LS			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000	sf feet cy per day per shift per ton tons per cy feet per cy LS			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf If			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per sf If cy sy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$66 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 9,600	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf lf cy sy lf			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 205,000 300,000 9,600 30	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per year if cy sy lf ft			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 9,600 30	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf If cy sy If ft per sf			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 9,600 31 \$119 \$500	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per sf If cy sy If ff per sf per lf			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Depth Sheetpile Depth Sheot Son	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$66 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 9,600 30 \$19 \$5500	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year  per sf If cy sy If ft per sf per lf			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 205,000 300,000 9,600 30 \$19 \$500 \$210	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf If cy sy II f f per sf per If per If per cy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 9,600 30 \$19 \$500 \$210 \$110	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per si If cy sy If ft per sf per lf per lf per cy per sy per sy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000  \$1.80 9,600 205,000 300,000 9,600 30 \$19 \$500 \$210 \$110 \$11	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per sf If cy sy If ft per sf per If per lf per cy per sy per sy per sy per sy			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding Mitigation	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 \$19 \$500	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year  per sf If cy sy If ft per sf per If per sf per ger per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding Mitigation Long-term Monitoring	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 205,000 300,000 9,600 205 \$180 \$19 \$500 \$210 \$11 \$11 \$11,0000 \$10,0000 \$20,0000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf lf cy sy ll ft per sf per lf per cy per sy per acre per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding Mitigation  Long-term Monitoring Long-term Monitoring	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 \$19 \$500	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf lf cy sy ll ft per sf per lf per cy per sy per acre per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Depth Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding Mitigation Long-term Monitoring	11,814,870 7,753,024 1.5 200 \$2,000 \$6 1.44 0.5 \$25 \$100,000 \$65,000 \$30,000 205,000 300,000 9,600 205 \$180 \$19 \$500 \$210 \$11 \$11 \$11,0000 \$10,0000 \$20,0000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf lf cy sy ll ft per sf per lf per cy per sy per acre per year			
Full Cap Area Partial Cap Area Sand Cap Depth Placement Rate Shift Rate (10 hours) Sand Purchase Sand Density Armored Cap Depth Cobbles Cap Placement QA Long-term O&M Long-term Monitoring Nearshore CDF Land Lease or Purchase Length Capping Volume Seeding Area Sheetpile Wall Length Sheetpile Cost Shot Rock Berm Rip Rap Clean Soil Cap Seeding Mitigation Long-term Monitoring Long-term Monitoring	11,814,870 7,753,024 1.5 200 \$2,000 \$2,000 \$6 1.4 0.5 \$25 \$100,000 \$65,000 \$30,000 \$1.80 9,600 205,000 300,000 \$19 \$500 \$210 \$11 \$11 \$110,000 \$10,000 \$20,000 \$25,000	sf feet cy per day per shift per ton tons per cy feet per cy LS per year per year per sf lf cy sy ll ft per sf per lf per cy per sy per acre per year		m2	o per ton

Dewatering - Upland Pond

Land Lease or Purchase \$1.80 per sf 360,284 sf Perimeter 2,401 lf Depth of Material in Dewatering Cell 4 feet 24 hours Cell Retention Time 5 feet \$20,000 LS Cell Depth Mobilization \$2,000 per acre Clear and Grub Berm Volume 2.4 cy per lf \$6 per cy \$0.25 per sf \$0.50 per sf Berm Construction Rough Grading Liner Placement Demob/Disposal \$10,000 LS \$6 per cy \$1 per sy Regrade Berm Soils Seed/Sod

Water Treatment

Flow Rate Unit, Purchase 658 gpm \$939,185 LS

\$0.40 per 1,000 gallons \$200 per day Water Treatment (Including Operator)

Water Treatment QA

Disposal

Off-Site Disposal

Load Soil for Hauling \$2.80 per ton Round-trip Hauling 2 hours \$43 per ton Tipping Fee \$75 per hour 32 tons Truck Rate Truck Load

\$14,000,000

New Landfill Disposal Landfill Construction

Institutional Controls

Public Education Program \$100,000 O&M Plans \$20,000 Deed Restrictions \$5,000

Annual Costs

Public Education Program \$30,000 \$800 \$20,000 \$20,000 Maintaining O&M Plans Reporting Long-term Monitoring

## ALTERNATIVE A: Dredge Sediment >250 ppb with Off-site Disposal

Capital Items Site Preparation		Quantity	Units LS		Cost \$100,000
Mobilization - Equipme	ent and Silt Curtain	1	LS		\$285,000
Dredging - 12 hour shift		457	Day		\$1,919,400
Dredge Monitoring (W		457	Day		\$365,600
Sediment Removal QA	• • • •	457	Day		\$548,400
Site Restoration		1	LS		\$25,000
	Direct Capital:				\$3,243,400
	Engineering, Procurement Contractor Overhead/Pro	t & Construction Managements:	ent:		389,208 486,510
	Total Capital:				\$4,100,000
	SI	EDIMENT DEWATE	RING (GRAVI	<b>TY</b> )	
Land Lease or Purchase		360,284	sf	,	\$648,511
Mobilization		1	LS		\$20,000
Clear and Grub		360,284	sf		\$16,542
Berm Construction		5,762	cy		\$34,574
Rough Grading		360,284	sf		\$90,071
Liner Placement		360,284	sf		\$180,142
Demob/Disposal Regrade		1 5,762	LS		\$10,000 \$34,574
Seed/Sod		40,032	cy sy		\$40,032
	Direct Capital:				\$1,074,445
	Engineering, Procuremen	t & Construction Manageme	ent:		128,933
	Total Capital:				\$1,200,000
		WATER TREA	ATMENT		
658 gpm unit, Purchase		1	LS		\$939,185
Water Treatment (Inclu	iding Operator)	606,504,221	gal		\$242,602
Water Treatment QA		640	Day		\$128,000
	Direct Capital:				\$1,309,786
	Engineering, Procurement	t & Construction Management	ent:		157,174
	Total Capital:				\$1,500,000
		SEDIMENT DISPOS	AL (OFF-SITI	Ε)	
Capital Items		Quantity	Units		Cost
Solidification		1,204,913	ton		\$30,122,825
Cement Purchase		57,377	ton		\$4,590,160
Soil Loading		1,204,913	ton		\$3,373,756
Soil Hauling		1,204,913	ton		\$5,648,030
-					
Tipping Fees		1,204,913	ton		\$51,811,259
	Direct Capital:				\$95,546,030
	Engineering, Procuremen	t & Construction Management	ent:		11,465,524
	Total Capital:				\$107,000,000
	TOTAL COST				\$113,800,000

## ALTERNATIVE B: Dredge Sediment >250 ppb and Pump Dredged Sediment to Off-site Landfill

Capital Items	Quantity	Units	Cost	
Site Preparation	1	LS	\$100,000	
Mobilization - Equipment and Silt Curtain	1	LS	\$285,000	
Dredging - 12 hour shifts	457	Day	\$1,919,400	
Dredge Monitoring (Water Quality)	457	Day	\$365,600	
Sediment Removal QA	457	Day	\$548,400	
Piping	7000	ft	\$105,000	
Road Crossings	12	ea	\$600,000	
Booster Pumps	1	ea	\$20,000	
Site Restoration	1	LS	\$25,000	
Direct Capital:			\$3,968,400	
Engineering, Procurement & C	onstruction Manageme	ent:	476,208	
Contractor Overhead/Profit:			595,260	
Total Capital:			\$5,000,000	
	WATER TREA	ATMENT		
658 gpm unit, Purchase	1	LS	\$939,185	
Water Treatment (Including Operator)	606,504,221	gal	\$242,602	
Water Treatment QA	640	Day	\$128,000	
Direct Capital:			\$1,309,786	
1				
Engineering, Procurement & Co	onstruction Manageme	ent:	157,174	
Total Capital:			\$1,500,000	
SEDIMENT DISPOSAL (OFF-SITE NR500 LANDFILL)				

Capital Items	Quantity	Units		Cost
Landfill Construction	1	LS		\$14,000,000
	Direct Capital:			\$14,000,000
	Engineering, Procurement & Construction Managem	-	1,680,000	
	Total Capital:			\$15,700,000
	TOTAL COST			\$22,200,000

## ALTERNATIVE C: Dredge Sediment to SWAC with Off-site Disposal

Capital Items		Quantity	Units	Cost
Site Preparation		1	LS	\$100,000
Mobilization - Equipme		1	LS	\$285,000
Dredging - 12 hour shi		410 410	Day	\$1,722,000
Dredge Monitoring (Ai Sediment Removal QA		410	Day Day	\$328,000 \$492,000
Site Restoration		1	LS	\$492,000 \$25,000
	Direct Capital:			\$2,952,000
	Engineering, Procurement &		ent:	354,240
	Contractor Overhead/Profit	:		442,800
	Total Capital:			\$3,700,000
	SED	IMENT DEWATE	RING (GRAVITY)	
Land Lease or Purchas		360,284	sf	\$648,511
Mobilization	е	300,284	LS	\$20,000
Clear and Grub		360.284	sf	\$16,542
Berm Construction		5,762	cy	\$34,574
Rough Grading		360,284	sf	\$90,071
Liner Placement		360,284	sf	\$180,142
Demob/Disposal		1	LS	\$10,000
Regrade		5,762	cy	\$34,574
Seed/Sod		40,032	sy	\$40,032
	Direct Capital:			\$1,074,445
	Engineering, Procurement &	Construction Manageme	ent:	128,933
	Total Capital:			\$1,200,000
		WATER TREA	ATMENT	
658 gpm unit, Purchase	3	1	LS	\$939,185
Water Treatment (Incl		543,723,015	gal	\$217,489
Water Treatment QA	\$ ·1·····/	574	Day	\$114,800
	Direct Comitals			\$1.271.474
	Direct Capital:			\$1,271,474
	Engineering, Procurement &	c Construction Manageme	ent:	152,577
	Total Capital:			\$1,400,000
	SI	EDIMENT DISPOS	AL (OFF-SITE)	
Capital Ita		Owantite	Linite	C4
Capital Items Solidification		Quantity	Units	Cost
		1,080,189	ton	\$27,004,725
Cement Purchase		51,438	ton	\$4,115,040
Soil Loading		1,080,189	ton	\$3,024,529
Soil Hauling		1,080,189	ton	\$5,063,386
Tipping Fees		1,080,189	ton	\$46,448,127
	Direct Capital:			\$85,655,807
	Engineering, Procurement &	Construction Manageme	ent.	10,278,697
	Engineering, Floculement o	Construction Managem	ont.	10,278,097
	Total Capital:			\$95,900,000

## INSTITUTIONAL CONTROLS

Capital Items Public Education Program O&M Plans Deed Restrictions	<b>Quantity</b> 1 1 1	Units LS LS LS		Cost \$100,000 \$20,000 \$5,000
Direct Capita				\$125,000
Engineering,	Procurement & Construction Manageme	ent:		15,000
Total Capita	ıl:			\$140,000
Present Worth of Longer Terr	n Operating Costs	Years	Annual Cost	
Long-term Monitoring		40	20,000	\$238,492
Public Education Program		40	30,000	\$357,738
Maintaining O&M Plans		40	800	\$9,540
Reporting		40	20,000	\$238,492
Total Presen	Worth, Longer Term O&M Costs			\$844,263
Total Projec	t Capital and O&M Cost			\$1,000,000
TOTAL CO	ST			\$103,200,000

## ALTERNATIVE D: Dredge Sediment to SWAC with On-site CDF

Capital Items		Quantity	Units		Cost
Site Preparation		1	LS		\$100,000
Mobilization - Equipmen	nt and Silt Curtain	1	LS		\$285,000
Dredging - 12 hour shift		410	Day		\$1,722,000
Dredge Monitoring (Air	and Water Quality)	410	Day		\$328,000
Sediment Removal QA Site Restoration		410 1	Day LS		\$492,000
Site Restoration		1	LS		\$25,000
	Direct Capital:				\$2,952,000
	Engineering, Procurement & Cons	truction Manageme	ent:		354,240
	Contractor Overhead/Profit:				442,800
	Total Capital:				\$3,700,000
	,	WATER TREA	ATMENT		
658 gpm unit, Purchase		1	LS		\$939,185
Water Treatment (Include	ling Operator)	543,723,015	gal		\$217,489
Water Treatment QA		574	Day		\$114,800
	Direct Conital:				\$1,271,474
	Direct Capital: Engineering, Procurement & Cons	truction Manageme	ant:		152,577
	Engineering, Frocurement & Cons	truction ivianageme	ciit.		132,377
	Total Capital:				\$1,400,000
		CDF CONST	TRUCTION		
Capital Items  Land Lease or Purchase		Quantity 2,700,000	Units sf		Cost \$4,860,000
Shot Rock/Rip Rap		9,600	lf		\$6,816,000
Sheetpile Placement		288,000	sf		\$5,472,000
Clean Soil Cap		205,000	cy		\$2,050,000
Seeding		300,000	sy		\$300,000
Mitigation		62	acre		\$619,834.71
	Direct Capital:				\$20,117,835
	Engineering, Procurement & Cons	truction Manageme	ent:		2,414,140
	Total Capital:				\$22,531,975
Present Worth of	Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term	O&M Costs			\$655,854
	Total Project Capital and O&M	Cost			\$23,200,000
	IN	STITUTIONA	AL CONTRO	DLS	
Capital Items		Quantity	Units		Cost
Public Education Progra	m	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital: Engineering, Procurement & Cons	truction Manageme	ent:		\$125,000 15,000
	Total Capital:				\$140,000
Present Worth of	Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	20,000	\$238,492
Public Education Progra			40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting			40	20,000	\$238,492
	Total Present Worth, Longer Term	O&M Costs			\$844,263
	Total Project Capital and O&M	Cost			\$1,000,000
	TOTAL COST				\$29,300,000

## ALTERNATIVE E: Cap Sediment to Maximum Extent Possible and Dredge to SWAC with On-site CDF

## CAPPING

		0.11.1	110		
Conital Itama		Overtitu	Ilmita		Cost
Capital Items Mobilization/Site Prep		Quantity 1	Units LS		\$100,000
Sand Purchase		603,013	tons		\$3,618,078
Placement - 10-hour shi	ifte	2,154	Day		\$4,308,000
Cobble Purchase and Pl		143,575	cy		\$3,589,363
Cap Placement QA	decinent	1	LS		\$100,000
Cap I lacement QA			Lij		\$100,000
	Direct Capital:				\$11,715,441
	Engineering, Procurement & Constr	uction Managem	ent:		1,405,853
	0 0,	C			
	Total Capital:				\$13,121,294
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Monitoring/O&M					
Long-term Monitoring			40	\$30,000	\$357,738
Long-term O&M			40	\$65,000	\$775,100
	Total Present Worth, Longer Term	O&M Costs			\$1,132,838
	m	a .			44.400.000
	Total Project Capital and O&M	Cost			\$14,300,000
	SEDIMENT RI	EMOVAL (H	ORIZONTA	LAUGER)	
	SEDIMENT KI	EMOVAL (II	OKIZONIA	L AUGER)	
Conital Itama		Overtitu	Ilmita		Cost
Capital Items Site Preparation		Quantity 1	Units LS		\$100,000
Mobilization - Equipme	ont and Silt Curtain	1	LS		\$285,000
Dredging - 12 hour shif		229	Day		\$961,800
Dredge Monitoring (Air		229	Day		\$183,200
Sediment Removal QA	and water Quarty)	229	Day		\$274,800
Site Restoration		1	LS		\$25,000
		-			<del>1-1</del> ,
	Direct Capital:				\$1,829,800
	Engineering, Procurement & Constr	uction Managem	ent:		219,576
	Contractor Overhead/Profit:	_			274,470
	Total Capital:				\$2,300,000
	V	VATER TREA	ATMENT		
658 gpm unit, Purchase		1	LS		\$939,185
Water Treatment (Inclu	ding Operator)	302,857,521	gal		\$121,143
Water Treatment QA		320	Day		\$64,000
	Direct Capital:				\$1,124,328
	Engineering, Procurement & Constr	uction Managem	ent:		134,919
	0 0,	C			
	Total Capital:				\$1,300,000
	Total capitali				Ψ2,000,000
		CDF CONS	TRUCTION		
Capital Items		Quantity	Units		Cost
Land Lease or Purchase		2,700,000	sf		\$4,860,000
Shot Rock/Rip Rap		9,600	lf		\$6,816,000
Sheetpile Placement		288,000	sf		\$5,472,000
Clean Soil Cap		205,000	cy		\$2,050,000
Seeding		300,000	sy		\$300,000
Mitigation		62	acre		\$619,834.71
	Direct Capital:				\$20,117,835
	Engineering, Procurement & Constr	uction Managem	ent:		2,414,140
	T (10 %)				A22 521 055
	Total Capital:				\$22,531,975
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation Mitigation	Longer Term Operating Costs		40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
				- 3 ** * **	T=,***
	Total Present Worth, Longer Term	O&M Costs			\$655,854

Total Project Capital and O&M Cost

\$23,200,000

#### INSTITUTIONAL CONTROLS

Capital Items Public Education Program O&M Plans Deed Restrictions	m Direct Capital:	Quantity 1 1 1	Units LS LS LS		Cost \$100,000 \$20,000 \$5,000 \$125,000
	Engineering, Procurement & Constru	ction Manageme	ent:		15,000
	Total Capital:				\$140,000
Present Worth of	Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	20,000	\$238,492
Public Education Program	m		40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting			40	20,000	\$238,492
	Total Present Worth, Longer Term C	0&M Costs			\$844,263
	Total Project Capital and O&M C	lost			\$1,000,000
	TOTAL COST				\$42,100,000

## ALTERNATIVE F: Cap All Sediment

#### CAPPING

Capital Items		Quantity	Units		Cost
Mobilization/Site Prep		1	LS		\$100,000
Sand Purchase		918,935	tons		\$5,513,610
Placement - 10-hour shifts	S	3,282	Day		\$6,564,000
Cobble Purchase and Place	ement	218,794	cy		\$5,469,847
Cap Placement QA		1	LS		\$100,000
]	Direct Capital:				\$17,747,457
1	Engineering, Procurement & Construc	ction Managem	ent:		2,129,695
	Total Capital:				\$19,877,152
	Longer Term Operating Costs		Years	Annual Cost	
Monitoring/O&M Long-term Monitoring			40	\$30,000	\$357,738
Long-term O&M			40	\$65,000	\$775,100
,	Total Present Worth, Longer Term O	&M Costs			\$1,132,838
Total Project Capital and O&M Cost					\$21,000,000
	INS	IIIUIIONA	AL CONTRO	ols	
Capital Items		Quantity	Units		Cost
Public Education Program	1	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
1	Engineering, Procurement & Construc	ction Managem	ent:		15,000
	Total Capital:				\$140,000
	Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	20,000	\$238,492
Public Education Program	1		40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting			40	20,000	\$238,492
	T-t-l D Wl. I T	&M Costs			\$844,263
,	Total Present Worth, Longer Term O	celvi Costs			\$644,203
	Total Project Capital and O&M Co				\$1,000,000

# BASIS FOR PRELIMINARY COST ESTIMATES SEDIMENT REMEDIATION FOX RIVER, WISCONSIN DE PERE DAM TO GREEN BAY

Metavial Handling Assumptions			
Material Handling Assumptions: Volume > 250 ppb	5,690,640	CV	4,344,000 m3
Volume > SWAC	5,065,822	•	3,867,040 m3
Volume > 50 ppm	247,996		189,310 m3
Volume > SWAC w/CDF	4,719,589		3,602,740 m3
Volume > SWAC Not Capped	4,259,024		3,251,163 m3
Solids Specific Gravity	2.36		
Fresh Water Density	62.4	lb/ft3	
In Situ Density	33.8%	w/w 20.9% v/v	1.08 tons per cy
Hydraulic Dredge Slurry Density (15% in situ)	7.1%		0.88 tons per cy
Dewatered Density		w/w 29.8% v/v	1.18 tons per cy
Treated Density	90%	w/w 84.6% v/v	1.92 tons per cy
Cost Estimating Parameters & Methodology:			
Interest Rate	8.0%		
Sales Tax	5.5%		
Engineering, Procurement and Construction Mgmt	12.0%		
Contractor Overhead and Profit - Dredging Only	15.0%		
<u>Dredging</u>	<b>#000</b>	,	
Dredge Monitoring (Water Quality)		per day	
Sediment Removal QA Hydraulic Low Solids - 10-inch Horizontal Auger (2917 gpm)	\$1,200	per day	
Site Preparation	\$100,000	IS	
Mobilization - Equipment		per dredge	
Mobilization - Silt Curtain	\$35,000	per dieuge	
Shift Rate (12 hours)		per shift	
Dredge Rate		cy in situ per 12 hour shift	
Site Restoration	\$25,000		
Length of Piping	132,000	ft	
Piping Purchase/Installation		per ft	
Number of Road Crossings	12		
Cost per Road Crossing		per crossing	
Number of Booster Pumps		each	
Booster Pump Cost	\$20,000	each	
Mechanical Project Control of the Co	¢40,000		
Mobilization - Equipment Mobilization - Silt Curtain	\$48,000	per dredge	
Mobilization - Watertighten Barge	\$100,000		
Shift Rate (12 hours)		per shift	
Dredge Rate		cy in situ per 12 hour shift	
Offload Stockpile Area Prep.	\$75,000		
Barge Capacity	1,800	cy	
Free Water per cy Dredged (10%)	20	gal	
Offload Shift Rate (12 hours)	\$2,900	per shift	
Upland Offloading Rate		cy per shift	
Barge Movement Time		hours	
Offload Crane Mobilization	\$50,000		
Site Restoration	\$25,000	LS	
Sediment Treatment			
High Temperature Thermal Desorption	\$50,000		
Setup Staging Area Mobilization/Site Prep	\$50,000 \$150,000		
Sediment Treatment QA		per ton	
Ratio of Amending Sand Volume to Dredge Vol.	0.25		
Sand Purchase and Deliver		per ton	
Blending		per ton	
HTTD (includes off-gas treatment)	\$75	per ton	
Stack Testing	\$50,000	LS	
Placement in CDF	\$2	per ton	
Capping Mahilipation/Sita Prop	¢100.000		
Mobilization/Site Prep Cap Area	\$100,000 6,075,811	sf 564,475	m2
Cap Area Sand Cap Depth		feet 504,475	III2
Placement Rate		cy per day	
Shift Rate (10 hours)		per shift	
Sand Purchase		per ton	
Sand Density	1.4	tons per cy	
Armored Cap Depth		feet	
Cobbles		per cy	
Cap Placement QA Long-term O&M	\$100,000	LS per year	
Long-term O&M  Long-term Monitoring		per year per year	
	φ50,000	r /om	

Nearshore CDF	Designed		Proposed		
Land Lease or Purchase		per sf	\$1.80		
Length	9,600		16,000		
Capping Volume	205,000	cv	330,000		
Seeding Area	300,000		500,000		
Sheetpile Wall Length	9,600	•	16,000		
Sheetpile Depth	30	ft	30		
Sheetpile Cost	\$19	per sf	\$19		
Shot Rock Berm		per lf	\$500		
Rip Rap	\$210	per lf	\$210		
Clean Soil Cap	\$10	per cy	\$10		
Seeding	\$1	per sy	\$1		
Mitigation	\$10,000	per acre			
-	\$10,000	per year			
Long-term Monitoring	\$20,000	per year			
Long-term O&M	\$25,000	per year			
Solidification					
Percent Cement	5%	(w/w)			
Cement	\$80	per ton	Mixing	\$25	per ton
Water Treatment	24.5			205	
Flow Rate		gpm (3 dredges)			gpm (4 dredges)
Unit, Purchase	\$479,953			\$570,377	
Flow Rate (2 Hydraulic Dredges)	3,107				
Unit, Purchase (Hydraulic Dredge)	\$2,382,582				
Water Treatment (Including Operator)		per 1,000 gallons			
Water Treatment QA	\$200	per day			
<u>Disposal</u>					
Off-Site Disposal					
Load Soil for Hauling	\$2.80	per ton			
Round-trip Hauling	2	hours			
Tipping Fee (non-TSCA)	\$43	per ton			
Tipping Fee (TSCA)	\$55	per ton			
Truck Rate	\$75	per hour			
Truck Load	32	tons			
New Landfill Disposal					
Landfill Construction	\$14,000,000				
Institutional Controls					
Public Education Program	\$100,000				
O&M Plans	\$20,000				
Deed Restrictions	\$5,000				
Annual Costs					
Public Education Program	\$30,000				
Maintaining O&M Plans	\$800				
Reporting	\$20,000				
Long-term Monitoring	\$20,000				

## ALTERNATIVE A: Dredge Sediment to >250 ppb with Off-site Disposal

## SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items	Quantity	Units	Cost
Mobilization - Equipment and Silt Curtain	4	LS	\$332,000
Watertight Barges	4	ea	\$400,000
Offload Stockpile Area Prep.	1	LS	\$75,000
Dredging - 12 hour shifts	3,162	Day	\$18,972,000
Dredge Monitoring (Water Quality)	3,162	Day	\$2,529,600
Sediment Removal QA	3,162	Day	\$3,794,400
Offload Crane Mobilization	1	LS	\$50,000
Crane Offloading - 8 hour shifts	3,162	Day	\$9,169,800
Direct Capital:			\$35,322,800
Engineering, Procurement & Co	onstruction Manageme	nt:	4,238,736
Contractor Overhead/Profit:			5,298,420
Total Capital:			\$44,900,000
	WATER TREA	TMENT	
287 gpm unit, Purchase	1	LS	\$570,377
Water Treatment (Including Operator)	456,922,546	gal	\$182,769
Water Treatment QA	1,107	Day	\$221,400
Direct Capital:			\$974,546
Engineering, Procurement & Co	onstruction Manageme	nt:	116,946
Total Capital:			\$1,100,000

#### SEDIMENT DISPOSAL (OFF-SITE)

	SE	DIMENT DISPOSA	AL (OFF-SITE)	
Capital Items		Quantity	Units	Cost
Solidification		4,966,761	ton	\$124,169,025
Cement Purchase		236,513	ton	\$18,921,040
Soil Loading		4,966,761	ton	\$13,906,931
Soil Hauling		4,966,761	ton	\$23,281,692
Tipping Fees (non-TSCA	A)	4,750,311	ton	\$204,263,386
Tipping Fees (TSCA)		216,450	ton	\$11,904,734
	Direct Capital:			\$396,446,807
	Engineering, Procurement &	Construction Manageme	ent:	47,573,617
	Total Capital:			\$444,000,000
	TOTAL COST			\$490,000,000

## ALTERNATIVE B: Dredge Sediment to >250 ppb and Pump Dredged Sediment to Off-site Landfill

Capital Items		Quantity	Units	Cost
Site Preparation		1	LS	\$100,000
Mobilization - Equipm		2	LS	\$570,000
Dredging - 12 hour shi		2189	Day	\$9,193,800
Dredge Monitoring (W	ater Quality)	2189	Day	\$1,751,200
Sediment Removal QA		2189	Day	\$2,626,800
Piping		132,000	ft	\$1,980,000
Road Crossings		12	ea	\$600,000
Booster Pumps		7	ea	\$140,000
Site Restoration		1	LS	\$25,000
	Direct Capital:			\$16,986,800
	Engineering, Procurement &	& Construction Manageme	nt:	2,038,416
	Contractor Overhead/Profit	•		2,548,020
	Total Capital:			\$21,600,000
		WATER TREA	TMENT	
3107 gpm unit, Purcha	se	1	LS	\$2,382,582
Water Treatment (Incl		6,854,590,422	gal	\$2,741,836
Water Treatment QA		3,065	Day	\$613,000
Piping		132,000	ft	\$1,980,000
	Direct Capital:			\$7,717,419
	Engineering, Procurement &	& Construction Manageme	nt:	926,090
	Total Capital:			\$8,600,000
	SEDIMENT	Γ DISPOSAL (OFF-S	SITE NR500 LANDFILL)	
Capital Items		Quantity	Units	Cost
Landfill Construction		1	LS	\$14,000,000
	Direct Capital:			\$14,000,000
	Engineering, Procurement &	Construction Managama	nt.	1,680,000
	Engineering, Procurement of	x Construction Manageme	iit.	1,080,000
	Total Capital:			\$15,700,000
	TOTAL COST			\$45,900,000

## ALTERNATIVE C: Dredge Sediment to SWAC with Off-site Disposal

TOTAL COST

## SEDIMENT REMOVAL (MECHANICAL DREDGING)

	~	KENO VILE (IVE		,	
Capital Items		Quantity	Units		Cost
Mobilization - Equipmer	nt and Silt Curtain	3	LS		\$249,000
Watertight Barges	Duran	4	ea LS		\$400,000 \$75,000
Offload Stockpile Area I Dredging - 12 hour shift		2,815	Day		\$16,890,000
Dredge Monitoring (Wa		2,815	Day		\$2,252,000
Sediment Removal QA	2 37	2,815	Day		\$3,378,000
Offload Crane Mobilizat		1	LS		\$50,000
Crane Offloading - 8 hou	ır shifts	2,815	Day		\$8,163,500
	Direct Conital				¢21 457 500
	Direct Capital: Engineering, Procurement & Cor	etruction Manageme	ant:		\$31,457,500 3,774,900
	Contractor Overhead/Profit:	istruction ivianageme	ant.		4,718,625
					, , , , , , ,
	Total Capital:				\$40,000,000
		WATER TREA	TMENT		
215 gpm unit, Purchase		1	LS		\$479,953
Water Treatment (Include	ling Operator)	406,753,628	gal		\$162,701
Water Treatment QA		1,314	Day		\$262,800
	Direct Capital:				\$905,455
	Engineering, Procurement & Cor	nstruction Manageme	ent:		108,655
	Total Capital:				\$1,000,000
	SEDI	MENT DISPOS	AL (OFF-SI	TE)	
			(0 0-	,	
Capital Items		Quantity	Units		Cost
Solidification		4,421,423	ton		\$110,535,575
Cement Purchase		210,544	ton		\$16,843,520
Soil Loading		4,421,423	ton		\$12,379,984
Soil Hauling		4,421,423	ton		\$20,725,420
Tipping Fees (non-TSC/	1)	4,204,973	ton		\$180,813,853
	1)	216,450	ton		
Tipping Fees (TSCA)		210,430	ton		\$11,904,733
	Direct Capital:				\$353,203,085
	Engineering, Procurement & Cor	estruction Manageme	ent:		\$42,384,370
	Zinginicorinig, i rocurement de cor	istacaon managem			ψ12,301,370
	Total Capital:				\$395,600,000
	I	NSTITUTIONA	L CONTRO	OLS	
Canital Itama		Quantity	Units		Cost
Capital Items Public Education Progra	m	Qualitity 1	LS		\$100,000
O&M Plans	•••	1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Cor	istruction ivianageme	ent.		\$15,000
	Total Capital:				\$140,000
D (W)			*7	1.0	
Long-term Monitoring	Longer Term Operating Costs		Years 40	Annual Cost 20,000	\$238,492
Public Education Progra	m		40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting			40	20,000	\$238,492
	Total Present Worth, Longer Ter	m O&M Costs			\$844,263
	Jongor Tor				Ψ0,203
	Total Project Capital and O&!	M Cost			\$1,000,000

\$437,600,000

## ALTERNATIVE D: Dredge Sediment to SWAC, On-site HTTD, Dispose in On-site CDF

## SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items	Quantity	Units	Cost
Mobilization - Equipment and Silt Curtain	3	LS	\$249,000
Watertight Barges	4	ea	\$400,000
Offload Stockpile Area Prep.	1	LS	\$75,000
Dredging - 12 hour shifts	2,622	Day	\$15,732,000
Dredge Monitoring (Water Quality)	2,622	Day	\$2,097,600
Sediment Removal QA	2,622	Day	\$3,146,400
Offload Crane Mobilization	1	LS	\$50,000
Crane Offloading - 8 hour shifts	2,622	Day	\$7,603,800
Direct Capital:			\$29,353,800
Engineering, Procurement & Co	nstruction Manageme	ent:	\$3,522,456
Contractor Overhead/Profit:	_		\$4,403,070
Total Capital:			\$37,300,000
SEDIMENT TREATMENT	(HIGH TEMPE	RATURE THERMAL	DESORPTION)
Capital Items	Quantity	Units	Cost
Setup Staging Area	1	LS	\$50,000
Mobilization/Site Prep	1	LS	\$150,000
Sand Purchase	51.536	ton	\$309,214
Blending	257,678	ton	\$6,441,953
Sediment Treatment	257,678	ton	\$19,325,860
Sediment Treatment QA	257,678	ton	\$515,356
Stack Testing	1	LS	\$50,000
Placement in CDF	143,155	ton	\$286,309
Direct Capital:			\$27,128,693
Engineering, Procurement & Co	nstruction Manageme	ent:	\$3,255,443
Total Capital:			\$30,400,000
	WATER TREA	ATMENT	
215 gpm unit, Purchase	1	LS	\$479,953
Water Treatment (Including Operator)	378,953,299	gal	\$151,581
Water Treatment QA	1,224	Day	\$244,800
Pi v C iv I			ФРД с 2014
Direct Capital: Engineering, Procurement & Co	netruction Manageme	ant:	\$876,334 \$105,160
Engineering, Procurement & Co	iistruction ivianageme	ant.	\$105,100
Total Capital:			\$1,000,000
CD	F CONSTRUCT	ION (DESIGNED)	
Capital Items	Quantity	Units	Cost
Land Lease or Purchase	2,700,000	sf	\$4,860,000
Shot Rock/Rip Rap	9,600	lf	\$6,816,000
Sheetpile Placement	288,000	sf	\$5,472,000
Clean Soil Cap	205,000	cy	\$2,050,000
Seeding	300,000	sy	\$300,000

Capital Items		Quantity	Units		Cost
Land Lease or Purchase		2,700,000	sf		\$4,860,000
Shot Rock/Rip Rap		9,600	lf		\$6,816,000
Sheetpile Placement		288,000	sf		\$5,472,000
Clean Soil Cap		205,000	cy		\$2,050,000
Seeding		300,000	sy		\$300,000
Mitigation		62	acre		\$619,835
	Direct Capital:				\$20,117,835
Engineering, Procurement & Construction Management:					\$2,414,140
	Total Capital:				\$22,531,975
Present Worth of	Total Capital:  Longer Term Operating Costs		Years	Annual Cost	\$22,531,975
Present Worth of	•		Years 40	Annual Cost 10,000	<b>\$22,531,975</b> \$119,246
	•				
Mitigation	•		40	10,000	\$119,246
Mitigation Long-term Monitoring	•	D&M Costs	40 40	10,000 20,000	\$119,246 \$238,492

## CDF CONSTRUCTION (PROPOSED)

Capital Items		Quantity	Units		Cost
Land Lease or Purchase		4,500,000	sf		\$8,100,000
Shot Rock/Rip Rap		16,000	lf		\$11,360,000
Sheetpile Placement		480,000	sf		\$9,120,000
Clean Soil Cap		330,000	cy		\$3,300,000
Seeding		500,000	sy		\$500,000
Mitigation		103	acre		\$1,033,058
	Direct Capital:				\$33,413,058
	Engineering, Procurement & Constru	uction Managem	ent:		\$4,009,567
	Total Capital:				\$37,422,625
D (W d			**	1.0	
	f Longer Term Operating Costs		Years	Annual Cost	0110.046
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term C	O&M Costs			\$655,854
	Total Project Capital and O&M C	Cost			\$38,100,000
	73.70				
	INS	STITUTIONA	AL CONTRO	DLS	
Capital Items		Quantity	Units		Cost
Public Education Progra	am	1	LS		\$100.000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Constru	uction Managem	ent:		15,000
	Total Capital:				\$140,000
Down AW (2)	FI T O		*7	11 C1	
Long-term Monitoring	f Longer Term Operating Costs		Years 40	Annual Cost 20,000	\$238,492
			40		\$236,492 \$357,738
Public Education Progra			40	30,000 800	\$357,738 \$9,540
Maintaining O&M Plan	S		40		
Reporting			40	20,000	\$238,492
	Total Present Worth, Longer Term C	O&M Costs			\$844,263
	Total Project Capital and O&M C	Cost			\$1,000,000
	TOTAL COST				\$131,000,000

## ALTERNATIVE E: Dredge Sediment to SWAC, with Off-site Disposal of TSCA Material and On-site CDF

## SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items		Quantity	Units		Cost
Mobilization - Equipme	ent and Silt Curtain	3	LS		\$249,000
Watertight Barges Offload Stockpile Area	Pren	4	ea LS		\$400,000 \$75,000
Dredging - 12 hour shif		2,622	Day		\$15,732,000
Dredge Monitoring (Wa		2,622	Day		\$2,097,600
Sediment Removal QA		2,622	Day		\$3,146,400
Offload Crane Mobiliza		1 2 622	LS		\$50,000 \$7,603,800
Crane Offloading - 8 ho	our sniits	2,622	Day		\$7,603,800
	Direct Capital:				\$29,353,800
	Engineering, Procurement & Con Contractor Overhead/Profit:	struction Manageme	ent:		\$3,522,456 \$4,403,070
	Total Capital:				\$37,300,000
	SEDI	MENT DISPOS	AL (OFF-SI	TE)	
			( -	,	
Capital Items		Quantity	Units		Cost
Solidification		216,451	ton		\$5,411,275
Cement Purchase		10,308	ton		\$824,640
Soil Loading		216,451	ton		\$606,063
Soil Hauling		216,451	ton		\$1,014,614
Tipping Fees		216,451	ton		\$11,904,805
	Direct Capital:				\$19,761,397
	Engineering, Procurement & Con	struction Manageme	ent:		2,371,368
	Total Capital:				\$22,100,000
		WATER TRE	TO A TENTE		
215 ann unit Durchasa		WATER TREA	LS		\$479,953
215 gpm unit, Purchase Water Treatment (Inclu		378,953,299	gal		\$479,933 \$151,581
Water Treatment QA	<i>3</i> 1 ,	1,224	Day		\$244,800
	B: . G :: 1				6074 224
	Direct Capital:				\$876,334
	Engineering, Procurement & Con	struction Manageme	ent:		\$105,160
	Total Capital:				\$1,000,000
	CDI	CONSTRUCT	ION (DESIG	GNED)	
Capital Items		Quantity	Units		Cost
Land Lease or Purchase	•	2,700,000	sf		\$4,860,000
Shot Rock/Rip Rap		9,600	lf		\$6,816,000
Sheetpile Placement Clean Soil Cap		288,000 205,000	sf		\$5,472,000 \$2,050,000
Seeding Seeding		300,000	cy sy		\$300,000
Mitigation		62	acre		\$619,835
	Direct Capital: Engineering, Procurement & Con	struction Manageme	ent:		\$20,117,835 \$2,414,140
	Total Capital:				\$22,531,975
	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring Long-term O&M			40 40	20,000 25,000	\$238,492 \$298,115
-	Total Present Worth, Longer Ten	m O&M Costs			\$655,854
	-				
	Total Project Capital and O&N	1 Cost			\$23,200,000

## CDF CONSTRUCTION (PROPOSED)

	621 66		1011 (11101	0022)	
Capital Items		Quantity	Units		Cost
Land Lease or Purchase		4,500,000	sf		\$8,100,000
Shot Rock/Rip Rap		16,000	lf		\$11,360,000
Sheetpile Placement		480,000	sf		\$9,120,000
Clean Soil Cap		330,000	cy		\$3,300,000
Seeding		500,000	sy		\$500,000
Mitigation		103	acre		\$1,033,058
· ·					
	Direct Capital:				\$33,413,058
	Engineering, Procurement & Construct	tion Manageme	ent:		\$4,009,567
	Total Capital:				\$37,422,625
Present Worth of	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term O&	kM Costs			\$655,854
Total Project Capital and O&M Cost				\$38,100,000	
	INST	TTUTIONA	AL CONTRO	DLS	
Capital Items		Quantity	Units		Cost
Public Education Progra	ım	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
	Engineering, Procurement & Construct	tion Manageme	ent:		15,000
	Total Capital:				\$140,000
Present Worth of	f Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring	Longer Term Operating Costs		40	20,000	\$238,492
Public Education Progra	ım		40	30,000	\$357,738
Maintaining O&M Plans			40	800	\$9,540
Reporting	•		40	20,000	\$238,492
				,	
	Total Present Worth, Longer Term O&	kM Costs			\$844,263
	Total Project Capital and O&M Co	st			\$1,000,000
	TOTAL COST				\$122,700,000

## $ALTERNATIVE\ F:\ Cap\ Sediment\ to\ Maximum\ Extent\ Possible\ and\ Dredge\ to\ SWAC\ with\ Off-site\ Disposal\ of\ TSCA\ Materials\ and\ On-site\ CDF$

#### CAPPING

Capital Items	Quantity	Units		Cost
Mobilization/Site Prep	1	LS		\$100,000
Sand Purchase	472,564	tons		\$2,835,384
Placement - 10-hour shifts	1,688	Day		\$3,376,000
Cobble Purchase and Placement	112,515	cy		\$2,812,875
Cap Placement QA	1	LS		\$100,000
Direct Capital:				\$9,224,259
Engineering, Procurement & Co	1,106,911			
Total Capital:				\$10,331,170
Present Worth of Longer Term Operating Costs		Years	Annual Cost	
Monitoring/O&M				
Long-term Monitoring		40	\$30,000	\$357,738
Long-term O&M		40	\$65,000	\$775,100
Total Present Worth, Longer Te	\$1,132,838			
Total Project Capital and O&M Cost				\$11,500,000

## SEDIMENT REMOVAL (MECHANICAL DREDGING)

Capital Items	Quantity	Units
Mobilization - Equipment and Silt Curtain	3	LS
Watertight Barges	4	ea
Offload Stockpile Area Prep.	1	LS
Dredging - 12 hour shifts	2,367	Day
Dredge Monitoring (Water Quality)	2,367	Day
Sediment Removal QA	2,367	Day
Offload Crane Mobilization	1	LS
Crane Offloading - 8 hour shifts	2,367	Day
Direct Capital:		
Engineering, Procurement & Construction Management:		
Contractor Overhead/Profit:		

## SEDIMENT DISPOSAL (OFF-SITE)

Total Capital:

Capital Items		Quantity	Units	Cost
Solidification		216,451	ton	\$5,411,275
Cement Purchase		10,308	ton	\$824,640
Soil Loading		216,451	ton	\$606,063
Soil Hauling		216,451	ton	\$1,014,614
Tipping Fees		216,451	ton	\$11,904,805
	Direct Capital:			\$19,761,397
	Engineering, Procurement	& Construction Manageme	nt:	2,371,368
	Total Capital:			\$22,100,000
		WATER TREA	TMENT	
215 gpm unit, Purchase		1	LS	\$479,953
Water Treatment (Include	ding Operator)	341,972,761	gal	\$136,789
Water Treatment QA		1,105	Day	\$221,000
	Direct Capital:			\$837,742
Engineering, Procurement & Construction Management:			100,529	
	Total Capital:			\$900,000

\$33,700,000

#### CDF CONSTRUCTION (DESIGNED)

	CDF C	ONSTRUCT	TON (DESIG	GNED)	
Capital Items Land Lease or Purchase		Quantity 2,700,000	Units sf		Cost \$4,860,000
Shot Rock/Rip Rap		9,600	lf		\$6,816,000
Sheetpile Placement		288,000	sf		\$5,472,000
Clean Soil Cap		205,000	cy		\$2,050,000
Seeding		300,000	sy		\$300,000
Mitigation		62	acre		\$619,835
	Direct Capital: Engineering, Procurement & Constru	ction Manageme	ent:		\$20,117,835 2,414,140
	Total Capital:				\$22,531,975
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term C	0&M Costs			\$655,854
	\$23,200,000				
	CDF C	ONSTRUCT	ION (PROP	OSED)	
Capital Items		Quantity	Units		Cost
Land Lease or Purchase		4,500,000	sf		\$8,100,000
Shot Rock/Rip Rap		16,000	lf		\$11,360,000
Sheetpile Placement		480,000	sf		\$9,120,000
Clean Soil Cap		330,000	cy		\$3,300,000
Seeding		500,000	sy		\$500,000
Mitigation		103	acre		\$1,033,058
	Direct Capital: Engineering, Procurement & Constru	ction Manageme	ent:		\$33,413,058 \$4,009,567
	Total Capital:				\$37,422,625
Present Worth o	f Longer Term Operating Costs		Years	Annual Cost	
Mitigation			40	10,000	\$119,246
Long-term Monitoring			40	20,000	\$238,492
Long-term O&M			40	25,000	\$298,115
	Total Present Worth, Longer Term C	0&M Costs			\$655,854
Total Project Capital and O&M Cost					\$38,100,000
	INS	TITUTIONA	L CONTRO	DLS	
Capital Items		Quantity	Units		Cost
Public Education Progra	nm	1	LS		\$100,000
O&M Plans		1	LS		\$20,000
Deed Restrictions		1	LS		\$5,000
	Direct Capital:				\$125,000
Engineering, Procurement & Construction Management:					15,000
	Total Capital:				\$140,000
	f Longer Term Operating Costs		Years	Annual Cost	
Long-term Monitoring			40	20,000	\$238,492
Public Education Progra			40	30,000	\$357,738
Maintaining O&M Plan	S		40 40	800	\$9,540 \$238,402
Reporting			40	20,000	\$238,492
Total Present Worth, Longer Term O&M Costs					\$844,263
Total Project Capital and O&M Cost \$1,0					\$1,000,000

TOTAL COST

\$130,500,000